

NEW GENERA AND SPECIES OF LEAFHOPPERS (HEMIPTERA:
CICADELLIDAE) FROM KYRGYZSTAN

D. V. NOVIKOV, G. A. ANUFRIEV, AND C. H. DIETRICH

(DVN and CHD) Center for Biodiversity, Illinois Natural History Survey, 607 E. Peabody Dr., Champaign, IL 61820 (e-mail: dietrich@inhs.uiuc.edu); (GAA) Department of Zoology, Nizhny Novgorod State University, Nizhny Novgorod, Russia

Abstract.—Two new genera and species of Paralimnini, *Ctenotettix kirgysicus* Novikov and Anufriev, n. gen. and n. sp., and *Triasargus ancoratus* Novikov and Anufriev, n. gen. and n. sp., and a new species of Ulopini, *Neobufonaria milkoii* Novikov and Anufriev, n. sp., from the western Tien Shan of Kyrgyzstan are described and illustrated. Ecological notes are included for *N. milkoii*.

Key Words: leafhopper, Central Asia, Tien Shan, grasslands, taxonomy

During the summers of 1998–2000, three month-long collecting expeditions to the steppe grasslands of Kyrgyzstan were undertaken by researchers from the Illinois Natural History Survey, Nizhny Novgorod State University (Russia), and the National Academy of Sciences of Kyrgyzstan. Sampling by sweep net and gasoline-powered vacuum in these grasslands yielded specimens of several hundred species of Auchenorrhyncha (Hemiptera: Cicadomorpha and Fulgoromorpha). Among these are two new deltocephaline leafhopper species, each apparently representing a separate, undescribed, genus of Paralimnini related to *Jassargus* Zachvatkin. Vacuum sampling in a high elevation boulder field in the western Tien Shan Mountains also yielded specimens of an undescribed species of the ulopine genus *Neobufonaria* Emeljanov, previously known from two species endemic to Central Asia (Emeljanov 1963, 1996) and another from Lebanon (Abdul-Nour 2000, Szwedo 2002). The new taxa, authorship of which should be attributed to Novikov and Anufriev, are described and illustrated herein. Holotypes are deposited

in the insect collection of the Illinois Natural History Survey, Champaign, Illinois, U.S.A [INHS]. Paratypes are in the Zoological Institute, Russian Academy of Sciences, St. Petersburg [ZIN], and the personal collection of G. A. Anufriev, Nizhny Novgorod State University, Russia [GAA].

Deltocephalinae Dallas 1870
Paralimnini Distant 1908

***Ctenotettix* Novikov and Anufriev,
new genus**

Type species.—*Ctenotettix kirgysicus* Novikov and Anufriev, new species.

Diagnosis.—*Ctenotettix* resembles *Jassargus*, but differs in the weakly produced head, the presence of supranumerary crossveins in the forewing clavus, the rocket-shaped connective, and the well-developed preapical lobe of the male style. Also characteristic of the new genus is the pecten of toothlike processes at the caudal edge of the pygofer lobe.

Description.—General appearance and body structure, apart from genitalia, similar to those of *Psanmotettix* Haupt, 1929. Moderately robust leafhoppers with re-

duced hind wings and slightly reduced forewings. *Head* (Fig. 1): Crown rounded, slightly angular apically, ratio of length to width 0.8; ocelli on border between face and crown closer to eyes than to each other. *Thorax*: Pronotum slightly convex, slightly wider posteriorly, narrower than head, with convex lateral margins. Mesoscutum basally $\frac{1}{3}$ of width of pronotum. Forewing rugose, slightly reduced, reaching abdominal tergum VII or VIII (specimen in Fig. 1 has the abdomen unusually distended), with supranumerary apical cells of variable number. Hind wing reduced, half as long as forewing. *Male genitalia*: Subgenital plate (Fig. 3) triangular, rounded posteriorly, approximately same length as valve, lateral margin straight, apex broadly rounded, marginal row of about 10 long macrosetae ending subapically. Genital capsule closed in posterior view along caudal edges of pygofer lobes. Pygofer lobe elongate (Fig. 2), with numerous long macrosetae in dorso-caudal area, caudal edge dentate forming dark pecten consisting of about 20 small triangular projections prominent in dorsal section, reduced ventrally to rugosity, inner surface in ventrocaudal corner with triangular leaflike fold directed dorsally. Style (Fig. 4) with well-developed preapical lobe; apophysis tapered, curved laterally, dentate preapically on posterior surface with 4 small rounded projections, apex narrowly rounded, basomedial lobe short. Connective (Fig. 4) linear, rocket-shaped, stem short, minimum width of base equal half its length; anterior arms $3.3\times$ length of base, with greatest spread not significantly wider than apex of stem, fused apically, apposing inner margins weakly concave. Aedeagus very distinctive (Figs. 5–6), base in poste-

rior view wide with pair of dorsolateral arms, shaft in lateral and posterior view wide, gonopore dorsal subapical on posterior surface; apical portion of shaft in dorsal view with compressed lobe dorsally, tongue-like in posterior view; pair of short basolaterally directed spines just basad of gonopore. *Female*: Abdominal sternum VII (Fig. 7) with central round notch bordered by triangular teeth and semicircular dark spots.

Notes.—*Ctenotettix* keys to *Cleptochiton* Emeljanov in Emeljanov's key to leafhopper genera of the European U.S.S.R. (Emeljanov 1967), but *Cleptochiton* differs markedly in having the subgenital plates strongly divergent with macrosetae restricted to the basal half, and in lacking preapical teeth on the style. Among known genera of Paralimnini, the only other genera having supranumerary claval crossveins are *Errastunus* Ribaut and *Triasargus*, n. gen. (described below).

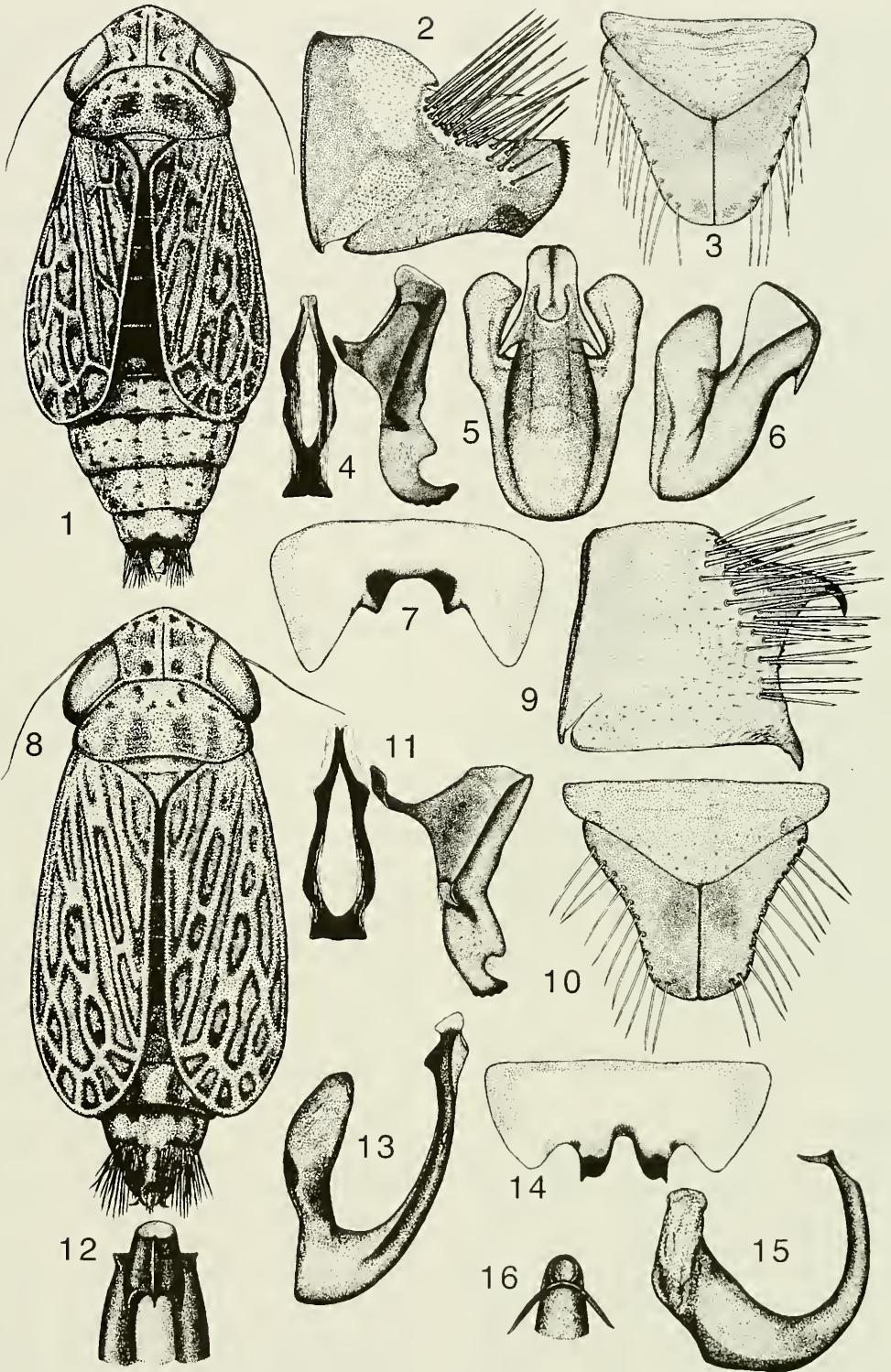
The name of the new genus, which is masculine, combines Greek words *ktenos* (comb) and *tettix* (cicada) referring to the shape of the caudal edge of the pygofer lobe. The genus is described based on one new species collected in dry to mesic steppe grasslands in the western Tien Shan.

***Ctenotettix kirgysicus* Novikov and Anufriev, new species**

(Figs. 1–7)

Description.—*Measurements* (mm). Male: length 3.3 ± 0.3 ; pronotum width 1 ± 0.05 ; head width 1.05 ± 0.05 . Female: length 3.2 ± 0.2 ; pronotum width 1.04 ± 0.05 ; head width 1.09 ± 0.02 . *Coloration* (Fig. 1): Yellowish gray, spotted with dark gray and brown to black. Crown with 4 small trian-

Figs. 1–16. 1–7, *Ctenotettix kirgysicus*. 1, Dorsal habitus. 2, Pygofer, lateral view. 3, Subgenital plates and valve, ventral view. 4, Connective and style, dorsal view. 5, Aedeagus, posterior view. 6, Same, lateral view. 7, Female sternite VII. 8–14, *Triasargus ancoratus*. 8, Dorsal habitus. 9, Pygofer, lateral view. 10, Subgenital plates and valve, ventral view. 11, Connective and style, dorsal view. 12, Aedeagus apex, anterodorsal view. 13, Aedeagus, lateral view. 14, Female sternite VII. 15–16, *Neobufonaria nilkoi*. 15, Aedeagus, lateral view. 16, Same, apex, anterodorsal view.



gular spots between ocelli, 2 large lighter triangular spots between apical corners of eyes, another row of four less distinct spots more posteriorly, and 4 spots by posterior margin, 2 inner of which more conspicuous. Pronotum with spots forming 6 indistinct longitudinal stripes, consisting of smaller and darker spots anteriorly and much larger but less intensely pigmented spots posteriorly. Mesoscutum and scutellum of general background color with small dots and no distinct patterns. Forewing with dark dots merging at cell borders framing most cells and rendering veins and wing border light. Abdominal terga dark under forewing, becoming lighter posteriorly with spots forming 2 transverse and 8 longitudinal groups on each tergum.

Material examined.—Holotype ♂, KYR-GYZSTAN: Dzhahalabad, ca. jct. Kara Kysmak & Chatkal R., 2,240 m, 42°4'0"N, 71°35'41"E, D.V. Novikov, 18 June 1999, sweeping, 99-58-06 [INHS]. Paratypes: 1 ♂, same data; 2 ♀, same locality, C.H. Dietrich, 18 June 1999, sweeping, 99-58-07; 2 ♀, same data, vacuum, 99-58-08; 1 ♂, 1 ♀, same data, 19 June 1999 99-58-15; 1 ♂, 1 ♀, same locality, G.A. Anufriev, June 18–19 1999 [ZIN]; 3 ♂, same data, [GAA]; 1 ♂, KYR-GYZSTAN: Chuy, Boom Ravine 3 km N Kyz-Kujo, 1,380 m, 42°39'28"N, 75°53'9"E, 6 July 1999, C.H. Dietrich, 99-84-01 [INHS].

Notes.—The name is from the country of origin, a noun in apposition.

***Triasargus* Novikov and Anufriev,
new genus**

Type species.—*Triasargus ancoratus* Novikov and Anufriev, new species.

Diagnosis.—*Triasargus* resembles *Ctenotettix* in general habitus, the presence of supranumerary claval crossveins, and in the shape of the subgenital plates, styles, and connective, but differs in the bizarrely modified pygofer lobes, the emarginate posterior margins of which together form a circular opening that reveals the aedeagal shaft in posterior view.

Description.—General appearance resembling that of robust species of *Psammotettix* Haupt. *Head* (Fig. 8): Crown rounded, slightly angular apically, ratio of length to width 0.7, ocelli on border between face and crown considerably closer to eyes than to each other. *Thorax*: Pronotum slightly convex, slightly wider posteriorly, narrower than head, with convex lateral margins. Mesoscutum basally half width of pronotum. Forewing submacropterous, rugose, slightly shorter than abdomen reaching abdominal tergum VIII or IX, with extra apical cells. Hind wing reduced, half as long as forewing. *Male genitalia*: Subgenital plate (Fig. 10) triangular with rounded posterior margin, slightly longer than valve, lateral edge concave, with about 10 macrosetae in marginal row with 1–2 subapical macrosetae diverged transversely. Genital capsule open in posterior view between caudal edges of pygofer lobes. Pygofer lobe square, truncate caudally (Fig. 9), with long macrosetae numerous in dorsocaudal area, 2 prominent processes curved ventrad, 1 extending from dorsocaudal corner and another extending from ventrocaudal corner. Style (Fig. 11) with well-developed preapical lobe, apophysis short, truncate, widening apically, dentate at apical edge; basomedial lobe elongate. Connective (Fig. 4) linear, stem very short, transverse, half as long as wide, branches with greatest spread slightly greater than of stem, fused apically; apposing medial margins moderately concave, strongly converging from base to apex. Aedeagus in lateral view (Fig. 13) U-shaped, with narrow base, shaft slender, tapering, with two small lateral lobes in the apical 1/3 portion of its length, gonopore subapical on posterior surface, apex (Fig. 12) complex with three lobes, two directed ventrally and one anteriorly. *Female*: Abdominal sternum VII (Fig. 14) with central U-shaped notch its sides diverging, flanked by characteristic rounded processes, processes dark apically bearing sharp triangular tooth laterally.

Notes.—The new genus keys to *Jassar-*

gus in Emeljanov's (1967) key, but is distinguishable from that genus based on the larger size, weakly produced head, and the presence of supranumerary crossveins on the forewing clavus. *Triasargus* is very similar to *Ctenotettix* externally and the two genera have supranumerary crossveins in the forewing clavus, a feature rare among Paralimnini. Thus it might be argued that the two species upon which these new genera are based belong in the same genus. We opted to recognize two separate genera for these species because the differences in the male genitalia, particularly the form of the connective base (long vs. short), subgenital plates (straight vs. concave laterally) and pygofer (narrow and closed vs. broad and open), are as great or greater than those which have been used to separate other genera of Paralimnini.

The Greek *trias* in the generic name (gender—masculine) refers to the threefold longitudinal configuration of the shaft of the aedeagus, with the gonoduct forming a medial thin-walled tube between lateral tubular sclerotized shaft supports.

***Triasargus ancoratus* Novikov and
Anufriev, new species**
(Figs. 8–14)

Description.—*Measurements* (mm). Male: length 3.3 ± 0.2 ; pronotum width 0.97 ± 0.02 ; head width 1.05 ± 0.02 . Female: length 3.5; pronotum width 1; head width 1.07. *Coloration*: Yellowish gray with dark spots. Crown with 4 triangular spots anteriorly, 2 large lighter triangular spots between apical corners of eyes, 4 spots posteriorly. Pronotum with 6 small spots anteriorly, and 6 longitudinal stripes posteriorly. Mesoscutum and scutellum with no patterns. Forewing with cells bordered dark. First 6 abdominal terga dark brown to black, terga VII–IX lighter with traces of longitudinal stripes.

Material examined.—Holotype ♂, KYR-GYZSTAN: Dzhahalabad, Chandalash R. 6km N jct. Chatkal R., 1,630 m, $41^{\circ}44'19''N$, $70^{\circ}52'22''E$, 20 June 1999,

C.H. Dietrich, vacuum, 99-60-05 [INHS]. Paratypes: 1 ♂, same data; 1 ♂, same data, 99-60-03; 1 ♂, 1 ♀, same locality, 21 June 1999, sweeping, 99-60-08; 3 ♂, same data, vacuum, 99-60-09; 1 ♂, same data, 20–21 June 1999, 99-60-14 [INHS, ZIN].

Notes.—The Greek *ankyra* (L. *ancora*) in the name of the species refers to the anchorlike apex of the aedeagus. The aedeagus of *T. ancoratus* is similar to that of *Parunculus rostratus* Emeljanov, 1964, but the latter has a broadly rounded subgenital plate, a posteriorly produced pygofer, and the shape of style and general habitus differ substantially from those of the new species.

Ulopinæ Le Peletier and Serville 1825
Ulopini

***Neobufonaria milkoi* Novikov and
Anufriev, new species**
(Figs. 15–16, 19)

Description.—*Measurements* (mm). Male: length 3.9 ± 0.1 ; pronotum width 1.1 ± 0.03 , head width 1.3 ± 0.03 . Externally closely resembling *N. oshanini* (Emeljanov) and *N. costata* (Emeljanov) (Figs. 17–18). Genital capsule and genitalia resembling those of *N. oshanini*, but differing in having distal processes of aedeagus much shorter, only slightly longer than preapical width of shaft (Fig. 15) (*N. oshanini* has apical aedeagal processes approximately 3× longer than preapical shaft width in lateral view; cf. Emeljanov 1996: fig. 47).

Material examined.—Holotype ♂, KYR-GYZSTAN: Naryn, Dzhumgal-Too Ridge, Seok R. east ravine, 3,090 m, $42^{\circ}12'04''N$, $74^{\circ}59'30''E$ 24 July 2000, C. H. Dietrich, vacuum, 00-111b [INHS]. Paratypes: 1 ♂, same data; 3 ♂, same locality, 25 July 2000 [INHS, ZIN].

Notes.—*Neobufonaria* Kocak 1981 (replacement for junior homonym *Bufonaria* Emeljanov 1963) previously included 3 species: *N. oshanini* (Emeljanov) from Tadzhikistan, *N. costata* (Emeljanov) from Kyr-



Figs. 17–19. *Neobufonaria* spp., dorsal habitus. 17, *N. oshanini* (Emeljanov), male lectotype. 18, *N. costata* (Emeljanov), female holotype. 19, *N. milkoï*, male holotype. Scale bar = 1 mm.

gyzstan and Kazakhstan (Emeljanov 1963, 1996), and *N. hermelensis* Abdul-Nour from Lebanon. *Neobufonaria milkoï* keys to *N. oshanini* in Szvedo's (2002) key to Palearctic Ulopini, but the new species is readily distinguished by its much shorter aedeagal processes. The type series of *N. milkoï* was collected by vacuuming *Lonicera* sp. (Caryophyllaceae) growing on boulders above 3,000 m in the Tien Shan Mountains, less than 100 km from the type locality of *N. costata*. Occurrence of *N. milkoï* and *N. costata* in the same region of Kyrgyzstan suggests that some *Neobufonaria* spp. are narrowly endemic. Thus, the holotype female of *N. costata* from Kzyl-Su, NW slope Terskei Alatau, Kyrgyzstan, may represent a different species from the males collected subsequently (1 from ca. Bosogo, Atbashi range, 3,500 m; 1 from 28 km S Narynkola, Kazakhstan, Terskei Alatau, Emeljanov 1996). Additional study of the fauna of this peculiar leafhopper genus in the Tien Shan and Pamir mountains will likely reveal the presence of additional endemic species.

We take great pleasure in naming this

species in honor of Dmitry A. Milko, Research Entomologist at the Institute of Biology and Pedology, National Academy of Sciences of Kyrgyzstan, who organized the joint Kyrgyz/Russian/U.S. expeditions that led to the discovery of the new taxa described in this paper.

ACKNOWLEDGMENTS

We are indebted to D. Milko and G. Lazkov, Institute of Biology and Pedology, National Academy of Sciences of Kyrgyzstan, for facilitating our fieldwork in Kyrgyzstan. L. L. Deitz, D. Dmitriev, J. N. Zahniser, and an anonymous referee made invaluable comments on an earlier draft of the manuscript. This work was supported in part by grant DEB 9870187 from the National Science Foundation (to C.H.D.).

LITERATURE CITED

- Abdul-Nour, H. 2000. Un nouvel Ulopinae du Liban: *Neobufonaria hermelensis* n. sp. (Hemiptera: Cicadomorpha: Cicadellidae: Ulopinae). *Mitteilungen der Schweizerischen Entomologischen Gesellschaft* 73: 333–336.
- Emeljanov, A. F. 1963. A new leafhopper genus from

the subfamily Ulopinae (Auchenorrhyncha, Cicadellidae). *Zoologicheskii Zhurnal* 42: 1581–1582.

———. 1967. Suborder Cicadinea (Auchenorrhyncha), pp. 421–551. *In* Bei-Bienko, G. Y., ed. *Keys to the Insects of the European U.S.S.R. I. Apterygota, Palaeoptera, Hemimetabola*. Israel Program for Scientific Translations, Jerusalem (first published in Russian by Nauka, Moscow-Leningrad, 1964).

———. 1996. Contribution to the knowledge of leafhoppers of the family Ulopidae (Homoptera, Cicadinae). *Entomologicheskoe Obozrenie* 75: 278–293 (English translation, *Entomological Review* 76: 327–341).

Szwedo, J. 2002. Ulopidae of the Palaearctic—The state of the art (Hemiptera: Clypeorrhyncha: Membracoidea). *Denisia* 4: 249–262.